

Amendments to Claims

This listing of claims will replace all prior revisions and listings of claims in this application.

Listing of Claims

- 1 1. **(Currently Amended)** A method comprising:
2 generating a phase-shift keyed optical signal; and
3 propagating the phase shift keyed optical signal through a semiconductor optical
4 amplifier in deep saturation, wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$, such that an optical
5 signal exhibiting a regulated, -amplified optical power is produced;
6 wherein the amplified optical power is regulated to a saturation output power such that
7 $\Delta P_{\text{OUT}}(\text{dB})/\Delta P_{\text{IN}}(\text{dB})$ of the optical amplifier is less than about 0.25, wherein P_{OUT} is
8 the power of the optical signal output from the amplifier, and P_{IN} is the power of the
9 optical signal input into the amplifier.
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1 2. **(Previously presented)** The method of claim 1, wherein the amplified optical power is
2 regulated to about the saturation output power of the semiconductor optical amplifier.
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1 3. **(Previsously Presented)** The method of claim 1, wherein a gain recovery time of the
2 optical amplifier is larger than the bit period of the optical signal.
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1 4. **(Original)** The method of claim 1, wherein the optical signal has a data-independent
2 intensity profile.
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1 5. **(Original)** The method of claim 1 wherein the optical signal is RZ-DPSK signal.
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1 6. **(Original)** The method of claim 1, wherein the optical signal is an $\pi/2$ -DPSK signal.
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1 7. **(Original)** The method of claim 1, wherein the optical signal is a constant-intensity DPSK
2 signal.

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1 8. **(Original)** The method of claim 1, wherein the optical signal is an RZ-DQPSK signal.

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9. **(Cancelled)**

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1 10. **(Currently Amended)** A method for optical limiting amplification comprising:

2 inputting a phase-shift keyed optical signal having a data independent intensity profile
3 into a semiconductor optical amplifier in a deep saturation regime wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$ such that an optical signal exhibiting a regulated, amplified optical
4 power is produced and output, wherein $\Delta P_{\text{OUT}}(\text{dB}) / \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25,
5 where P_{OUT} is the power of the optical signal output from the amplifier, and P_{IN} is the
6 power of the optical signal input into the amplifier.
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1 11. **(Previously Presented)** The method of claim 10, wherein a gain recovery time of the
2 optical amplifier is larger than the bit period of the optical signal.

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1 12. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DPSK signal.

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1 13. **(Original)** The method of claim 10, wherein the optical signal is an $\pi/2$ -DPSK signal.

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1 14. **(Original)** The method of claim 10, wherein the optical signal is a constant-intensity
2 DPSK signal.

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1 15. **(Original)** The method of claim 10, wherein the optical signal is an RZ-DQPSK signal.

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16. **(Withdrawn)**

1 17. **(Currently Amended)** An optical signal processor apparatus comprising:

2 a semiconductor optical amplifier device adapted to operate in deep saturation , wherein -
3 $4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$, and to receive an RZ-DPSK optical signal having an amplitude-
4 shift keyed optical label portion, such that the optical label portion of the signal is
5 removed upon propagation through the semiconductor optical amplifier device;

6 wherein $\Delta P_{\text{OUT}}(\text{dB}) / \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
7 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
8 amplifiers.

18. **(Withdrawn)**

1 19. **(Currently Amended)** An optical communication system for transmitting multi-channel
2 phase-shift keyed optical signals comprising:

3 a plurality of semiconductor optical amplifiers,

4 wherein the system is adapted to transmit the optical signals such that the plurality of
5 semiconductor optical amplifiers operate ~~in deep saturation amplifier~~ in a deep saturation
6 regime wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$ so as to provide optical power equalization of a
7 plurality of channels of the multi-channel optical signals,

8 wherein $\Delta P_{\text{OUT}}(\text{dB}) / \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
9 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
10 amplifiers.

1 20. **(Currently Amended)** An apparatus comprising:

2 a means for generating a phase-shift keyed optical signal; and

3 a means for propagating the optical signal through a semiconductor optical amplifier in deep
4 saturation wherein $-4\text{dBm} < P_{\text{IN}} < 4\text{dBm}$ to regulate the amplified optical power;

5 wherein $\Delta P_{\text{OUT}}(\text{dB}) / \Delta P_{\text{IN}}(\text{dB})$ is less than about 0.25, where P_{OUT} is the power of the optical
6 signal output from the amplifiers, and P_{IN} is the power of the optical signal input into the
7 amplifiers.